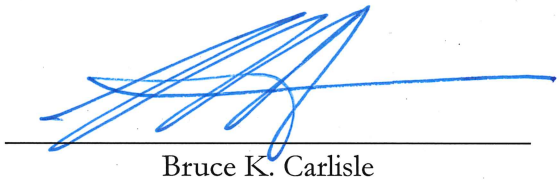
A Proposal to the:
National Oceanic and Atmospheric Administration
Office for Coastal Management
2015 Coastal Management Fellowship Program

Submitted by:
Massachusetts Office of Coastal Zone Management

Project Title:
Stormwater Solutions
Resilient Stormwater Management for Massachusetts Coastal Communities

Massachusetts Office of Coastal Zone Management
251 Causeway Street, Suite 800
Boston, MA 02114-1219
(617) 626-1200
Fax: (617) 626-1240



Bruce K. Carlisle
Director

Background and Introduction

Stormwater continues to be a serious source of pollutants to waterbodies in Massachusetts and across the nation. Unlike point sources of pollution, which have identifiable discharge points, stormwater flows over the land surface and picks up fertilizers, pesticides, oil, grease, toxins, trash, sediment, bacteria, and other contaminants along the way before discharging to ground or surface waters. Paved areas and other impervious surfaces prevent stormwater from percolating into the ground, and consequently, waterbodies in areas with a high percentage of impervious surface are most at risk for water quality degradation—a risk that is magnified after intense rainfall. Contaminants from untreated stormwater discharges decrease water quality and results in closed shellfish beds, beach closures, and degraded coastal habitats.

The Massachusetts Office of Coastal Zone Management (CZM), along with federal and state partners, has led efforts to assist coastal communities in managing stormwater discharges in Massachusetts. Since 1996, CZM has provided funding directly to communities through the Coastal Pollutant Remediation (CPR) Grant Program, with more than $8.7 million awarded to municipalities to manage stormwater in the coastal zone. The Coastal Nonpoint Source Management Plan (Coastal NPS Plan), which was first developed in 1989 under CZM's leadership, presents a comprehensive strategy for preventing, controlling, and reducing stormwater and other nonpoint sources of pollution to protect and improve the quality of the Commonwealth's coastal waters. The Coastal NPS plan was recently revised in 2014 to include updated five- and 15-year strategies to manage stormwater.

Among the goals of the Coastal NPS Plan update is a move to provide **specific targeted technical assistance to local officials**. Now is a critical time to provide technical assistance to municipalities for stormwater management. The U.S. Environmental Protection Agency (EPA) recently issued a new draft permit for small Municipal Separate Storm Sewer Systems (MS4s) located in Massachusetts, which extends regulations to small MS4s in urbanized areas as defined in the 2010 census. (The previous permit finalized in 2003 regulates MS4s in large urbanized areas only, as defined by the 2000 census.) The new permit requirements, known as MS4 small Phase II, will affect 260 municipalities in Massachusetts, including 67 coastal communities not currently covered under the 2003 general permit.

The permit requirements, while necessary to protect against water quality impairments from stormwater, will be burdensome for these small municipalities. The draft general permit requires municipalities to develop, implement, and enforce a Stormwater Management Program and implement six control measures including public education and outreach, management of construction site runoff, management of runoff from new development and redevelopment, and good housekeeping in municipal operations. EPA estimates that costs for each community will run from $78,000 to $829,000 per year, averaged over the permit term. In addition to the financial burden, small communities may lack the technical expertise to develop comprehensive Stormwater Management Programs and will be looking for state assistance to fulfill these requirements.

Future climatic changes, such as altered weather patterns, changes in precipitation, increasing rates of erosion, hydrographical changes, and sea level rise, will have wide-ranging impacts on stormwater discharges in the coastal zone—potentially changing the way stormwater is managed and the type of technologies that can be successfully used. To address this issue, CZM and the Massachusetts

Department of Environmental Protection (MassDEP) are funding an innovative study to analyze the performance of stormwater best management practices (BMPs) in the face of these changes. Results of this study will be available in June 2015 and will inform efforts to build a coastal stormwater management program that is resilient to climate change impacts.

CZM has been a leader in developing innovative programs to give individuals and municipalities the tools they need to address challenging and complex issues in the coastal zone. One significant example is CZM's StormSmart Coasts Program (www.mass.gov/czm/stormsmart). Developed by a National Oceanic and Atmospheric Administration (NOAA) Coastal Services Center (CSC) Fellow in 2007 and 2008, this successful program provides planning, policy, regulatory, and technical tools to improve coastal floodplain management in Massachusetts. This project has since spread beyond the borders of Massachusetts—the launch of the Massachusetts StormSmart Coasts initiative in 2008 led to the development of a national StormSmart Coasts Network in 2009 made up of a growing partnership of coastal decision makers supported by NOAA and CSC, the Northeast Regional Ocean Council, Gulf of Mexico Alliance, and others.

In the current round of the Coastal Management Fellowship, CZM is seeking a Fellow to build on this successful model and launch the coastal communities component of CZM's new Stormwater Solutions Program. Through this effort, CZM will provide stormwater management tools to Massachusetts coastal communities that are both effective in improving coastal water quality and resilient to climate change (i.e., capable of enduring the effects of coastal storms, erosion, flooding, sea level rise, and other climate change impacts and responding to, recovering from, and adapting to these impacts). As with StormSmart Coasts, this project represents a tremendous opportunity for a qualified Coastal Management Fellow to build a cutting-edge program, engage with coastal communities, and address significant coastal management issues (both stormwater pollution, the leading cause of water quality impairment in the United States, and climate change).

Goal and Objectives

The goal of this Fellow project is to develop and launch the coastal communities component of the Stormwater Solutions Program to increase the effectiveness and resiliency of local stormwater management in Massachusetts. The Fellow will accomplish this by:

1. Engaging with municipalities to provide technical assistance on stormwater management in the coastal zone with a focus on targeted priority watershed areas, effective and resilient technologies, available funding mechanisms, and permit requirements.
2. Evaluating CZM's Coastal Pollutant Remediation Grant Program to help maximize the success of funded projects and encourage a greater number of eligible communities to apply, especially historically underserved and environmental justice communities.
3. Developing the coastal communities component of the Stormwater Solution website and associated materials to serve as a model program to support effective stormwater management at the local level.

Project Description, Milestones, and Outcomes

The Fellow will evaluate current activities and technologies to manage stormwater in the Massachusetts coastal zone and use these results to develop the coastal communities component of

the Stormwater Solutions Program. Modeled after the highly successful StormSmart Coasts initiative, the Stormwater Solutions Program will work to directly address needs at the local level. Through this project, robust strategies will be developed to specifically help municipalities develop and implement a Stormwater Management Program that effectively treats stormwater and meets MS4 small Phase II requirements. In addition, targeted assistance will be provided to ensure that any stormwater management technologies implemented will remain effective throughout their design life and will be resilient to impacts of climate change.

Task 1 - Develop Options for Resilient and Cost-Effective Stormwater Treatment in the Coastal Zone

Using the results of the CZM-MassDEP funded study on the performance of stormwater BMPs in the face of climate change impacts and other available resources, including the *Massachusetts Stormwater Handbook* and *Handbook on Green Infrastructure for Stormwater Treatment*, the Fellow will rank available stormwater treatment technologies and develop a list of options appropriate for use by Massachusetts coastal communities. The technologies shown to be most effective at reducing and/or removing priority contaminants, cost effective, and resilient to climate impacts in the coastal zone will be identified and prioritized, along with opportunities to incorporate green infrastructure approaches (i.e., rainwater harvesting, permeable pavements, bioswales, etc.) into stormwater management at the local level. The results of this task will be used to develop tools in Task 3.

Outcome and Milestone for Task 1: Prioritized list of resilient and cost-effective stormwater treatment options appropriate for the Massachusetts coastal zone. (*Completed by February 2016*)

Task 2 - Assess Municipal Stormwater Management Programs in the Coastal Zone

The draft general permits require regulated small MS4s to develop, implement, and enforce a Stormwater Management Program. Working with CZM and National Estuary Program (NEP) regional staff, the Fellow will conduct a standardized survey to assess the status of municipal stormwater management programs already in place in the Massachusetts coastal zone. The results of this survey will be used by the Fellow to evaluate current stormwater management capability at the local level. In addition, the Fellow will investigate currently existing initiatives and tools for technical assistance at the local, state, regional, and national level that target municipalities, if any. This information will be used to determine where gaps exist and where direct technical assistance from CZM is most needed and to prioritize the development of technical tools in Task 3.

Outcome and Milestone for Task 2: Assessment of coastal stormwater management programs and technical assistance needs. (*Completed by May 2016*)

Task 3 - Develop Technical Tools and Outreach to Municipalities

Using the information gathered in the first two tasks, the results of the CZM-MassDEP funded study on the performance of stormwater BMPs in the face of climate change, existing resources identified in Task 2, and MS4 small Phase II permit requirements, the Fellow will assemble and develop technical tools and materials to assist municipalities within the Massachusetts coastal zone with stormwater management. In particular, the Fellow will design a series of factsheets. Potential topics include:

1. Components of an effective municipal stormwater management program.

2. How to develop a water quality monitoring program with quality control/quality assurance.
3. Available resources for education and outreach.
4. Highly ranked technologies, including climate resilient options and green infrastructure.
5. Financing mechanisms for stormwater management.
6. Pretreatment systems and how they improve stormwater management.
7. Stormwater treatment retrofits.
8. Stormwater management options for redevelopment and new development.
9. Strategies for effective operation and maintenance.

Outcome and Milestone for Task 3: Factsheets and technical tools developed specifically for Massachusetts coastal communities. (*Completed by June 2017*)

Task 4 - Evaluate the Coastal Pollutant Remediation Grant Program

The CPR Grant Program provides funding to Massachusetts municipalities to assess and treat stormwater pollution from paved surfaces and to design and construct commercial boat waste pumpout facilities. The Fellow will evaluate the performance of this grant program by reviewing previously funded projects and examining their desired outcomes to determine, to the extent practicable, whether the goals of each individual project and the overall goals of the grant program have been met. The Fellow will then:

1. Develop a series of recommendations to help encourage all eligible communities to apply for grants, with a focus on communities that have not typically applied.
2. Create a project database with a record of completed projects, results, and outcomes.
3. Create case studies of new CPR success stories for stormwater management.
4. Examine projects that did not meet expectations and provide recommendations on improvements.
5. Explore the feasibility and applicability of incorporating green infrastructure and resilient stormwater management into grant priorities.
6. Assemble a checklist of characteristics from successful projects and explore how to incorporate these components into evaluation criteria and request for responses for future grant rounds.

CZM will use the results of this task to implement changes to the CPR Grant Program and the Fellow will assist CZM staff with project selection and implementation during the FY 2016 and 2017 grant rounds.

Outcome and Milestone for Task 4: CPR Grant Program review and recommendations (*Completed by June 2016 and ongoing throughout project*)

Task 5 - Develop the Stormwater Solutions/Community Tools Website

Using the tools developed in Task 3 and existing resources identified in Task 2, the Fellow will work with the CZM communications staff to develop an informative, easy-to-use website to serve as a clearinghouse of stormwater information, educational materials, case studies, and technical tools for coastal communities.

Outcome and Milestone for Task 1: Stormwater Solutions for Coastal Communities website. (*Completed by June 2017 and ongoing throughout project*)

Task 6 - Stormwater Solutions Training Workshops for Coastal Communities

The Fellow will work with CZM regional staff, NEP regional staff, the newly formed Cape Cod Stormwater Managers Group, and Upper North Shore Merrimack Valley Stormwater Management Collaborative, along with regional conservation commission networks and other partners to provide 2-5 training workshops on the available tools developed in Task 3 and Task 5. The trainings will focus on what tools are available, how to access/utilize the tools, and resources for further assistance. The Fellow will also explain what funding resources are available through the CPR grant program, encourage widespread participation in the grant program, and provide feedback on what types of projects are grant priorities.

Outcome and Milestone for Task 6: 2-5 Stormwater Solutions training workshops delivered to coastal communities. (*Completed by August 2017*)

Fellow Mentoring

CZM will serve as the host agency for the Coastal Management Fellow. The Fellow will work directly with a team of CZM staff members involved in water quality, science communications, and technical outreach, as well as with CZM's Regional Coordinators who serve as liaisons to the coastal communities. The Mentor for the Fellow will be Adrienne Pappal, CZM's Coastal Habitat and Water Quality Specialist. Adrienne joined CZM in 2007 and has experience in a wide variety of coastal habitat and water quality issues, including serving as the coordinator of Coastal Pollutant Remediation (CPR) grant program, as well as working on the aquatic invasive species management, wetland assessment, and other issues. She has developed numerous science communications products and has extensive experience working with the public to communicate technical information. Prior to CZM, Adrienne worked in the MassDEP Division of Watershed Management as a water quality analyst and quality assurance/quality control specialist.

CZM has benefited greatly from CSC Coastal Management Fellows in the past and has a strong commitment to, and proven track record of, providing Fellows with a professional work experience and environment, integrating them into the agency, and promoting their career advancement—including work with CZM beyond their Fellow service as opportunities allow. CZM looks forward to continued success for both our agency and our Fellows with this program and this specific project.

Project Partners

To successfully accomplish the project objectives outlined above, the Fellow will work directly with CZM staff in Boston and the regions. In addition to CZM, team members include the Massachusetts Bays National Estuary Program and regional staff, Buzzards Bay National Estuary Program, Massachusetts Department of Environmental Protection, and U.S. Environmental Protection Agency. Through this mix of agencies, the Fellow will have direct access to professionals with a wide variety of backgrounds and gain real-world experience in managing complex coastal issues.

Cost Share Description

CZM will provide the match for the Fellow through state funds. The $15,000 nonfederal match requirement will come from annual state capital. CZM will supply the Fellow with all workplace support necessary, including desk, phone, computer and required software, printers and plotters, field equipment, and general office supplies. CZM will ensure that the Fellow receives the guidance and training necessary to successfully implement each of the project objectives.

Strategic Focus Areas

This Fellow project is directly relevant to and will advance management efforts for two 2015-2017 strategic focus areas: Healthy Coastal Ecosystems and Resilient Coastal Communities. Specifically, the project addresses the following components of these focus areas.

Healthy Coastal Ecosystems

- *Build innovative natural and social science research capacity, products, and applications that reflect user-driven science, and synthesize, visualize, communicate, and transfer research results to strengthen policies and decisions, and effectively manage coastal and ocean resources.* Through this project, the Fellow will research options for effective and climate-change resilient stormwater management in Massachusetts, as well as options for refining the CPR Grant Program. The direct goal of these efforts is to communicate and transfer research results to the users of this information—in this case coastal communities—to provide them with the tools they need to effectively manage stormwater and better protect coastal water quality.

- *Support coastal and ocean resource managers through cooperative funding, data, information, tools, training, technical assistance, analysis, and exchange of best practices to strengthen ecosystem policies, build capacity, and implement prioritized management efforts.* This project directly aims to build capacity and implement prioritized management efforts at the local level by working directly with coastal communities to design information and technical assistance tools and provide training on best practices for stormwater management. In addition, the project will help refocus CPR funding opportunities for communities to build and implement stormwater solutions that are both effective and resilient to climate change.

Resilient Coastal Communities

- *Build capacity to pursue strategies such as hazard preparedness, mitigation, and post-hazard redevelopment planning by providing an integrated suite of data, information, training, technical assistance, cooperative funding, and policy tools to coastal communities.* Through this project, the Fellow will provide coastal communities with information, technical assistance, policy tools, and training to develop and sustain stormwater management programs that are effective and resilient to climate change impacts, helping the communities to enhance their hazard preparedness and mitigation strategies. In addition, the Fellow will work to expand the reach of CPR cooperative funding to more communities and incorporate green infrastructure and climate-resilient technologies into grant priorities.

- *Identify and engage partners in maximizing the understanding, visualization, and application of risk-wise strategies.* Through this project, the Fellow will work directly with coastal communities to help maximize understanding of climate change impacts on stormwater management and will provide tools to enable municipalities to apply risk-wise stormwater treatment technologies that are resilient to climate change and will remain effective through their design life.